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## Natural Enemies of Medfly Provide Basis for Its Control

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**M**editerranean fruit fly, commonly known as medfly (*Ceratitis capitata*), is one of the most devastating pests of fruits and vegetables. It attacks more than 300 plant species, ranging from citrus to peppers.

Adult females pierce and penetrate ripening fruit and lay their eggs. Larvae hatching from these eggs feed on the fruit (see photo), resulting in extensive losses, especially in fruit destined for export.

Although native to sub-Saharan Africa, medfly was already well established as an introduced pest in Hawaii, South America, and Australia by the early 1900s. Most of our knowledge about this fruit fly pest

comes from efforts to control it in areas where it has been introduced. Few studies have been conducted in native habitats.

Renewed interest in the potential for using natural enemies as an integral component of integrated pest management (IPM) programs for medfly has led to the need for a better understanding of the pest and its natural enemies in Africa.

With support from USDA's National Research Initiative (NRI) Competitive Grants Program, researchers at Texas A&M University and collaborators in Kenya and England are sampling medfly populations in arabica coffee and conducting research on the natural enemies of medfly.

AN ADULT MEDFLY OBTAINS  
NUTRIENTS BY LAPPING UP JUICES  
FROM A DAMAGED COFFEE BERRY.



PHOTO CREDIT: ROBERT COPELAND

*This research highlights the crucial role of systematics – the science of animal and plant classification – as an integral component of biological control programs.*

## PREFERRED HOST

Arabica coffee is a preferred host of medfly in Kenya. Various collaborative efforts over the past 5 years have uncovered a rich community containing 4 fruit fly species and 10 species of parasitic wasps living in coffee berries.

Part of the NRI-sponsored research has focused on the features of puparia – the rigid outer shells formed from the larval skin – for determining which of these fly species serve as hosts of the various wasp species. By isolating individual fruit fly puparia from tens of thousands of field-collected fruits, researchers have found that at least some of the parasitic wasps preferentially attack medfly in the field.

Intensive sampling at one of the sites in Kenya also indicates that at least two of these parasitic wasp species routinely attack the Natal fly (*Ceratitis rosa*). This medfly relative is a serious pest of many fruits in various parts of Africa.

This research highlights the crucial role of systematics – the science of animal and plant classification – as an integral component of biological control programs.

For example, researchers found that one of the 10 species of wasps reared from fruit flies in coffee in Kenya was new to science. It was first formally described in 1999 by an NRI-sponsored program. This newly discovered species of *Fopius* has thus far been reared only from medfly.

Two other species belong to the genus *Tetrastichus*, a group of small (1-2 mm)

wasps notoriously difficult to identify. Work by the British collaborator on this project has uncovered a feature on the wings that can be easily used to separate the two species. Resolution of this identification problem, which persisted for 80 years, greatly facilitates work on the biology of the two species.

With identification possible, host range differences can now be determined. Systematics research on a fourth species, a member of the genus *Psytalia*, has centered on whether distinct host races exist and, if so, whether they can be identified.

The species of *Psytalia* that the researchers reared from medfly in coffee in Kenya is virtually identical morphologically to *Psytalia concolor* – used in Mediterranean countries for biological control of the olive fly.

## IMPACT

Pest management practices based on biological control are an alternative to using traditional chemical insecticides. The results of this research have provided a basis for identifying natural enemies of fruit fly pests. Doing so increases the potential use of natural enemies in biologically controlling medfly and its kin. ❖

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*Besides R. Wharton, other researchers on this project include J. LaSalle, CABI, England; S. Kimani-Njogu, ICIPE, Kenya; and M. Trostle, Texas A&M University.*

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